

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Application No. : 10/051,459 Confirmation No. : 6980  
First Named Inventor : Hans BEER  
Filed : January 22, 2002  
TC/A.U. : 1797  
Examiner : Lyle Alexander  
  
Docket No. : 103655.50685US  
Customer No. : 23911  
  
Title : Surface-Enhanced Membrane and Process and  
Apparatus for Producing Same

**REPLY BRIEF**

**Mail Stop Appeal Brief - Patents**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In response to the Examiner's Answer mailed May 12, 2009, the Appellants submit the following reply. The two-month response due date, extended to the first business day following a weekend, is July 13, 2009.

**1. The Examiner's Answer Simply Fails to Address the Primary Difference Between the Claimed Invention and the Cited Art.**

While the Answer spends an inordinate amount of time on the question of whether mechanical brushing of surfaces was previously known, it fails to deal with the fundamental difference between the present invention and the prior art.

As set forth in the original Specification, and as supported by Declarations from one of the most experienced practitioners in the field (Dr. Beer), in the prior art membranes were formed by "pouring membrane casting solutions directly onto a film" (Specification at 2:8-12), where the prior art casting solutions

required costly, complex and inefficient purification before use to eliminate membrane-fouling contaminants (low molecular weight impurities in the feedstock materials which form “filter dust”). *Id.* at 2:13-32. As confirmed by Dr. Beer in his declaration, it was well known in the art that these prior art membranes were far too delicate to withstand mechanical cleaning after they were formed – hence the need for the highly purified feedstocks.

In contrast, the *claimed* invention uses a fundamentally different membrane formation process, which eliminates the need for the costly feedstock purification. As recited in claim 1, step (a), the first step of this new membrane formation process is to prepare a membrane “from a cellulose membrane casting solution *by phase inversion in an evaporation process*” – a process which results in a membrane which, before it is dry, can withstand having impurities removed from its surface “by mechanical brushing while rinsing with water from at least one side of said partially-dried feedstock membrane ... .” Claim 1, step (b).

In order to aid the Examiner’s understanding of the difference between the prior art process and the present phase inversion process, the Appellants provided the Examiner with a textbook definition of what constitutes phase inversion in an evaporation process in their March 28, 2008 Response. *See* March 28, 2008 Response, Annex III (third page, first paragraph of Chapter 7 “Phase-Inversion Membranes”). In contrast to the prior art’s merely pouring a casting liquid onto a film to harden into a membrane, the present invention’s phase-inversion in an evaporation process involves a different feedstock material and, importantly, results in a mechanically different product.

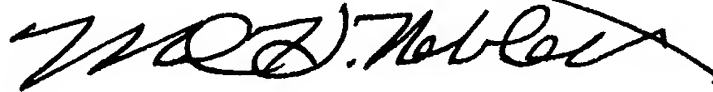
Specifically (and as independently supported by the Annex III textbook description), the membrane is formed by first mixing a polymer solution with a second evaporable solvent material, and then creating the membrane as the polymer portion of the solution “*inverts* into a swollen three-dimensional macromolecular network or gel” – *i.e.*, a physical structure that has a larger volume and different, stronger polymer structure after the solvent is evaporated than the prior art’s poured and solidified membrane. March 28, 2008 Annex III (third page, first paragraph (*italic emphasis in original; underline added*)). It is this structure that Dr. Beer found to be capable of withstanding the sort of post-membrane formation cleaning that was universally recognized by those of skill in the art as not feasible with the prior art poured membranes. Dr. Beer thus had developed a fundamentally new approach to membrane formation that is suitable for use without costly and complex pre-purified feedstock materials.

Because the Examiner has essentially ignored step (a) of claim 1, which requires the membrane to be formed “by phase inversion in an evaporation process” – not even discussing this feature, let alone citing any prior art on point – and further because the Examiner has not considered the invention as a whole (*i.e.*, the radical departure from the prior art’s expensive “purify, then pour” approach to the new “form by phase inversion, *then* remove impurities” approach), the pending rejections are not sustainable. Accordingly, the Appellants respectfully renew their request for reversal of the pending rejections.

No additional fees are believed due in connection with this Reply Brief,  
however, authorization is granted to charge any deficiency in fees or credit any  
overpayments to Deposit Account No. 05-1323 (Docket #103655.50685US).

Respectfully submitted,

July 9, 2009

A handwritten signature in black ink, appearing to read "J.D. Evans", with a long horizontal flourish extending to the right.

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